ABSTRACT OF THE DISCLOSURE

A via hole defining process performed in one chamber is described. A substrate with a dielectric layer thereon is provided. A patterned mask layer having an opening therein is formed on the dielectric layer. An anisotropic etching process is conducted to form a via hole in the dielectric layer within an etching chamber by using the patterned mask layer as a mask. A portion of the patterned mask layer around the via hole is then removed by an oxygen (O_2) treatment in the same etching chamber, while the profile of the via hole is retained. Another anisotropic etching process is conducted in the same etching chamber to remove a portion of the dielectric layer to broaden the upper portion of the via hole. Because the via hole defining process is performed within one single chamber, the whole process time can be decreased.